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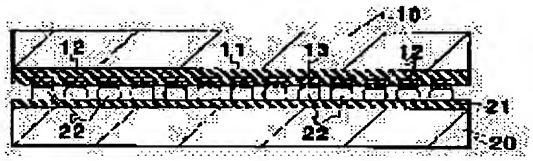
(54) FORMATION OF SUBSTRATE ELECTRODE

(57)Abstract:
PURPOSE: To shorten a manufacturing time by permitting a substrate provided with an electrode that has wettability to a bump electrode to abut with a transfer substrate bump electrode, which does not have wettability to the electrode, so as to transfer and removing the transfer substrate.
CONSTITUTION: A semiconductor element and a multilayer interconnection part 11 are formed on the plane of a semiconductor wafer 10, and an electrode 12, which connects with an electrode 13 on a final protecting film and forms a reacting layer allowing high wettability to a bump electrode 22, is arranged. A plurality of bump electrodes 22 are formed by lift off method on the surface of the single crystal silicon substrate of a transfer substrate 20 which does not have wettability to the electrode 13 through a silicon oxide film 21. The bump electrodes 22 are permitted to abut on the surfaces of the electrodes 13 by facing and positioning a semiconductor pellet 10 and a transfer substrate 20. Then, solder reflow is performed and the bump electrodes 22 are transferred to the surfaces of the electrodes 13 at one time. When the transfer substrate 20 is removed, the bump electrodes 22 separate from the transfer substrate 20 and the transfer is completed. Thus, the manufacturing time is shortened and yield is improved.



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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The electrode formation approach of the substrate characterized by having the following processes (1) thru/or (4).
(1) In the location corresponding to the electrode of said 1st substrate the process which forms the electrode which has wettability to a bump electrode material on the front face of the 1st substrate, and (2) — The 2nd substrate with which the bump electrode was formed on the front face which does not have wettability to the bump electrode material is prepared beforehand. The process which arranges the bump electrode of said 2nd substrate for the front face of said 2nd substrate on the front face of said 1st substrate in contact with the facing-each-other and electrode top of said 1st substrate, (3) — the process which imprints a bump electrode on the front face of the electrode of the 1st substrate from the front face of said 2nd substrate while performing a reflow process and securing the wettability of the electrode of said 1st substrate, and a bump electrode, and (4) — the process which removes the 2nd substrate from on the front face of said 1st substrate.
[Claim 2] The process which imprints a bump electrode from the 2nd substrate to the electrode of the 1st substrate indicated by said claim 1 is the electrode formation approach of the substrate characterized by using it as a process which forms the bump electrode for restoration.
[Claim 3] The process which forms the 1st substrate indicated by said claim 1 is a process which forms the 1st substrate with which two or more electrodes have been arranged. The process for which said 2nd substrate is prepared is a process which forms the 2nd two or more substrates which have small size compared with the size of said 1st substrate. While the process which imprints said bump electrode imprints the bump electrode of a part of 2nd substrate of two or more sheets to some [of said 1st substrate] electrodes of the plurality The electrode formation approach of the substrate characterized by being the process which imprints the bump electrode of the 2nd substrate of the remainder of two or more sheets to the electrode of the remainder of the plurality of said 1st substrate.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] Especially this invention is applied to the electrode formation technique which forms a bump electrode in the electrode of the front face of a substrate about an electrode formation technique, and relates to an effective technique.
[0002]
[Description of the Prior Art] A CCB (Controled Collapse Bonding) method is in the method which mounts semi-conductor pellets, such as IC and LSI, in mounting substrates, such as a printed-circuit board. Between the electrode of a mounting substrate and the electrodes (bonding pad) of a semi-conductor pellet intervenes a bump electrode (solder projection electrode), and a CCB method is connected electrically and mechanically. This CCB method has the description which can improve packaging density compared with a wirebonding method.
[0003] The formation approach of the bump electrode of said CCB method has two kinds, the lift-off method and the solder ball supplying method, in use. The lift-off method is the approach of forming solder on the front face of the electrode of a semi-conductor pellet alternatively with the photoresist pattern formed with the photolithography technique. Solder is formed by vacuum deposition or plating. The solder ball supplying method is the approach of aligning a detailed solder ball on the front face of the electrode of a semi-conductor pellet with a glass mask etc.
[0004] Since said solder ball supplying method has a limitation in each of detailed-izing of the pattern of detailed-izing of a solder ball, and a glass mask, when detailed-ization is required, generally the lift-off method is adopted.
[0005] If the formation process from a semiconductor wafer to mounting is divided roughly into each of a last process process and a back process process, the formation process of the bump electrode which adopts said lift-off method will be built into a last process process. Said last process process includes a process until it forms the pattern of two or more same semi-conductor pellets on the surface of a semiconductor wafer, and gives dicing to this semiconductor wafer and forms two or more semi-conductor pellets. A back process process includes a process until it carries out assembly mounting of the semi-conductor pellet formed in said last process process. That is, in a last process process, after the formation process of a bump electrode forms the last protective coat on the pattern of two or more semi-conductor pellets of a semiconductor wafer, it forms an electrode (bump substrate electrode) on the front face of this last protective coat, and forms a BAMBU electrode by the lift-off method on the front face of this electrode.
[0006] Although said lift-off method was mentioned above, it applies and hardens the photoresist film with a photolithography technique first in a detail further on the whole surface. Then, each of sensitization processing, a development, and washing processing is given to this photoresist film one by one, and the photoresist mask with which opening of the front-face top of an electrode was carried out is formed. Then, said photoresist mask is used and solder is formed on the front face of the electrode on the front face of a photoresist mask, and in opening. And said photoresist mask is removed, the solder on the front face of this photoresist mask is removed, and a bump electrode is formed with the solder on the front face of an electrode.
[0007] In addition, the CCB method is indicated by issue, the Nikkei electronics, a separate volume "micro DEBAISEZU", the 140th page, or the 147th page on June 11, 1984, for example.
[0008]
[Problem(s) to be Solved by the Invention] In formation of the bump electrode which adopts the above-mentioned lift-off method, it is not considered in the following point.
[0009] (1) The process which forms said bump electrode is included in the last process process which forms a semi-conductor pellet. For this reason, the formation process of the whole including a last process process and a back process process becomes long, and the period taken to complete a formation process becomes long (**** compaction cannot be aimed at).
[0010] (2) Since the process which forms said bump electrode needs to form a bump electrode to the thickness of hundreds [mum], require long duration, consequently the whole formation process becomes long, and the period taken to complete a formation process becomes long.
[0011] (3) After forming a bump electrode in the electrode of a semi-conductor pellet, inspection is conducted, the bump electrode of a defect part is removed, and repair which forms the bump electrode for restoration in this removed part again cannot be performed substantially. That is, the problems of using in piles the lift-off method which forms a photoresist mask again on the front face of the bump electrode of an excellent article, and forms solder **********(ing) the yield of a formation process occur frequently.

[0012] (4) Said bump electrode may be formed in the front face of the electrode of the front face of not only when forming in the front face of the electrode of a semi-conductor pellet, but a mounting substrate. Recently, many semi-conductor pellets are mounted in one mounting substrate, and it is in the inclination which the mounting substrate itself enlarges. However, in order to form a bump electrode in a large-sized mounting substrate, development of the large-sized manufacturing installation which performs the lift-off method, installation, or plant-and-equipment investment is required.
[0013] The purpose of this invention is in the bump electrode formation technique of a substrate to offer the technique which can aim at **** compaction.
[0014] Other purposes of this invention are in the bump electrode formation technique of a substrate to offer the technique which can be improved in the yield while attaining said purpose.
[0015] Other purposes of this invention are in the bump electrode formation technique of a substrate to offer the technique which can form a bump electrode in a large-sized substrate while attaining said purpose.
[0016] As new along [said] this invention a description as the other purposes will become clear by description and the accompanying drawing of this specification.
[0017]
[Means for Solving the Problem] It will be as follows if the outline of a typical thing is briefly explained among invention indicated in this application.
[0018] (1) In the location corresponding to the electrode of the process which forms the electrode which has wettability to a bump electrode material on the front face of the 1st substrate in the electrode formation approach of a substrate, and said 1st substrate The 2nd substrate with which the bump electrode was formed on the front face which does not have wettability to the bump electrode material is prepared beforehand. While performing the process and reflow process which arrange the bump electrode of said 2nd substrate for the front face of said 2nd substrate on the front face of said 1st substrate in contact with the facing-each-other and electrode top of said 1st substrate and securing the wettability of the electrode of said 1st substrate, and a bump electrode The front face of the electrode of the 1st substrate is equipped with the process which imprints a bump electrode, and the process which removes the 2nd substrate from on the front face of said 1st substrate from the front face of said 2nd substrate.
[0019] (2) The process which imprints a bump electrode from the 2nd substrate to the electrode of the 1st substrate indicated by said means (1) is used as a process which forms the bump electrode for restoration.
[0020] (3) The process which forms the 1st substrate indicated by said means (2) is a process which forms the 1st substrate with which two or more electrodes have been arranged. The process for which said 2nd substrate is prepared is a process which forms the 2nd two or more substrates which have small size compared with the size of said 1st substrate. The process which imprints said bump electrode is a process which imprints the bump electrode of the 2nd substrate of the remainder of two or more sheets to the electrode of the remainder of the plurality of said 1st substrate while imprinting the bump electrode of a part of 2nd substrate of two or more sheets to some [of said 1st substrate] electrodes of the plurality.
[0021]
[Function] According to the means (1) mentioned above, the following operation effectiveness is acquired. (A) As opposed to a series of formation processes which form a bump electrode in the electrode of the front face of said 1st substrate Since the process which removes the process and the 2nd substrate which process the process which forms the bump electrode itself in juxtaposition as a formation process of the 2nd substrate, and imprint a bump electrode from the 2nd substrate in a series of formation processes of said 1st substrate is only added The part equivalent to the process which forms the bump electrode itself, and a series of formation processes of said 1st substrate are shortened, and the period required by process completion can be shortened (**** compaction). (B) From a series of formation processes of said 1st substrate, by that (the management can be transferred to the formation process of the 2nd substrate) which can eliminate the process which forms the bump electrode itself, generating of the pollutant accompanying the process which forms the bump electrode itself in a series of formation processes of said 1st substrate can be eliminated, and the yield can be improved in a series of formation processes of said 1st substrate. (C) Since the process which imprints the bump electrode of the 2nd substrate to the electrode of the front face of said 1st substrate can be made to serve a double purpose at the reflow process included in a series of formation processes of said 1st substrate, the part which made this process serve a double purpose, and a series of formation processes of said 1st substrate are shortened, and the period required by process completion can be shortened.
[0022] According to the means (2) mentioned above, the bump electrode for restoration can be independently formed in the 2nd substrate other than the operation effectiveness of said means (1) to a series of formation processes of said 1st substrate. And since it can form in the predetermined electrode of the 1st substrate only by imprinting the bump electrode for restoration of the 2nd substrate, the bump electrode formed in the electrode of the 1st substrate is easily restorable in a short time (repair is possible).
[0023] A bump electrode can be formed in the 1st substrate of large-sized size if the bump electrode is beforehand formed in each of the 2nd substrate which was subdivided besides the operation effectiveness of said means (1) according to the means (3) mentioned above. If it puts in another way, development of the large-sized electrode formation equipment which forms a bump electrode in the 1st substrate of large-sized size, installation, or plant-and-equipment investment can be lost.
[0024] Hereafter, the configuration of this invention is explained with one example.

[0025] In addition, in the complete diagram for explaining an example, what has the same function attaches the same sign, and explanation of the repeat is omitted.
[0026]
[Example]
(Example of fruit ** 1) The configuration of the imprint substrate which imprints a bump electrode to the electrode of the semi-conductor pellet which is the example 1 of this invention is shown in drawing 1 (sectional view).
[0027] As shown in drawing 1 , the imprint substrate 20 is constituted by the subject in a single crystal silicon substrate. The oxidization silicon film 21 is intervened on the front face of the single crystal silicon substrate of this imprint substrate 20, and two or more bump electrodes 22 are formed.
[0028] As shown in drawing 2 (perspective view in the predetermined process of the formation process of the imprint substrate 20), one imprint substrate 20 carries out the dicing of the semiconductor wafer 20 formed with the single crystal silicon substrate to the shape of a rectangle (pellet type), and is formed. Two or more patterns 23 which form one imprint substrate 20 in the front face of said semiconductor wafer 20 are formed in the shape of a matrix. Since the semi-conductor pellet 10 with which the bump electrode 22 is finally formed is formed from the semiconductor wafer which consists of single crystal silicon, forming the imprint substrate 20 from the same semiconductor wafer can use the formation process of the semi-conductor pellet 10, and it can form the imprint substrate 20 easily. The imprint substrate 20 is used as a parent for forming the bump electrode 22. In said semiconductor wafer 20, 20F are an orientation flat.
[0029] Said oxidization silicon film 21 is formed between the ingredients of the bump electrode 22 for the purpose of what (wettability is not good) it does not have wettability for. That is, the oxidization silicon film 21 and the bump electrode 22 do not form a reaction layer, but the bump electrode 22 is formed on the front face of the oxidization silicon film 21, without having almost no adhesive strength.
[0030] Said bump electrode 22 is formed by the lift-off method in this example, for example, is formed with Pb-Sn system solder (for example, Pb:Sn=4:6). After the lift-off method intervenes the oxidization silicon film 21, and forms a photoresist mask, and this photoresist mask is used for it and it deposits solder with vacuum deposition or plating on the front face of said imprint substrate 20, it removes a photoresist mask, leaves solder to a required field, and forms the bump electrode 22 with this solder. A photoresist mask is formed with a photolithography technique. The bump electrode 22 formed on the front face of this imprint substrate 20 is formed in the location corresponding to the location where the electrode 13 of the semi-conductor pellet 10 has been arranged.
[0031] Next, in the formation process of the semi-conductor pellet 10, drawing 3 thru/or drawing 5 (important section sectional view showing the imprint approach for every process) are used, and how to imprint the bump electrode 22 of said imprint substrate 20 on the semi-conductor pellet 10 is explained briefly.
[0032] First, a last process process is given and the field of two or more semi-conductor pellets is formed in the component forming face of the semiconductor wafer 10 which consists of single crystal silicon. The field of this semi-conductor pellet is formed by forming a semiconductor device in the component forming face of a semiconductor wafer 10, and forming the multilayer-interconnection section 11 which two or more layers each of a wiring layer and an insulating layer put on the upper layer of this semiconductor device by turns (refer to drawing 3). An electrode (bonding pad) 12 is most arranged among said multilayer-interconnection sections 11 at the upper wiring layer. This electrode 12 is formed in a subject for example, in the aluminium alloy film. An electrode 12 is electrically connected to the electrode 13 formed on the front face of said last protective coat through opening formed in the last protective coat of the top layer of the multilayer-interconnection section 11. Said electrode 13 is used as a substrate metal membrane of the bump electrode 22, forms a reaction layer between the bump electrodes 22, and has high wettability (compared with the oxidation silicon film 21, it has high wettability).
[0033] The electrode 13 formed in the field of said semi-conductor pellet consists of three-tiered structures which carried out the laminating of each of Cr film 13from front-face side of last protective coat A, nickel film (or Cu film) 13B, and Au film 13C one by one as shown in drawing 7 (A) in the outline of cross-section structure. Lower layer Cr film 13A is formed considering the corrosion prevention of an adhesive improvement and an electrode 12 with the last protective coat of a substrate as a key objective. The middle class's nickel film 13B is formed considering adhesive improvement with lower layer Cr film 13A and the bump electrode 22 as a key objective. Upper Au film 13C is formed considering antioxidizing of an interlayer's nickel film 13B as a key objective.
[0034] Next, dicing is performed to said semiconductor wafer 10 for every field of a semi-conductor pellet, and two or more semi-conductor pellets 10 subdivided separately are formed. After this dicing is completed, a last process process is completed mostly.
[0035] Next, as shown in drawing 3 , facing each other and positioning are performed for the imprint substrate 20 beforehand formed of the formation process which was performed to juxtaposition and was independently performed on said semi-conductor pellet 10 to the formation process of this semi-conductor pellet 10. This positioning is performed by making each location of two or more bump electrodes 22 of the imprint substrate 20 in agreement with each location of two or more electrodes 13 arranged at the component forming face side of the semi-conductor pellet 10.
[0036] Next, as shown in drawing 4 , each front face of two or more electrodes 13 of the semi-conductor pellet 10 is contacted in each of two or more bump electrodes 22 of the imprint substrate 20. And after this, a solder reflow is given and two or more bump electrodes 22 are collectively imprinted from the imprint substrate 20 on each front face of two or more electrodes 13 of the semi-conductor pellet 10 (it is made to move). Said solder reflow is performed at the temperature of for example, 200 [**] extent. By this solder reflow, the bump electrode 22 has the

electrode 13 of the semi-conductor pellet 10, and wettability, and is firmly pasted up compared with between the bump electrode 22 and the oxidation silicon film 21 of the imprint substrate 20 between the bump electrode 22 and an electrode 13.

[0037] Cross-section structure when the bump electrode 22 pastes the electrode 13 of said semi-conductor pellet 10 is shown in drawing 7 (B). Au film 13C of the upper layer of an electrode 13 is absorbed by the bump electrode 22, and the upper part of the middle class's nickel film 13B reacts with the bump electrode 22, and generates nickel-Sn alloy film 13D. That is, the final cross-section structure where the bump electrode 22 of an electrode 13 was formed is formed by the three-tiered structure which carried out the laminating of each of Cr film 13A, nickel film 13B, and nickel-Sn alloy film 13D.

[0038] Next, as shown in drawing 5 , by removing the imprint substrate 20 from the semi-conductor pellet 10, the bump electrode 22 firmly pasted up on the electrode 13 of the semi-conductor pellet 10 secedes from the imprint substrate 20, and an imprint completes it. A perspective view shows the semi-conductor pellet 10 with which the bump electrode 22 was imprinted by drawing 6 .

[0039] Next, a back process process is given, and as shown in drawing 8 (sectional view of the mounting condition of a semi-conductor pellet), the semi-conductor pellet 10 is mounted in the mounting substrate 30. A glass epoxy resin substrate is formed in a parent, and, as for the mounting substrate 30, the multilayer-interconnection section 31 which has the wiring layer 32 of two or more layers is formed on the component side of this glass epoxy resin substrate. On the front face of the multilayer-interconnection section 31 of the mounting substrate 30, the electrode 33 with high wettability is arranged between the bump electrodes 22 like the semi-conductor pellet 10. Mounting of the semi-conductor pellet 10 to said mounting substrate 30 is performed by pasting up the bump electrode 22 beforehand formed in the semi-conductor pellet 10 on the electrode 33 of the mounting substrate 30.

[0040] After mounting of this semi-conductor pellet 10 is completed, a back process process is completed and the formation process of 1 in all ream is completed.

[0041] Thus, it sets to the formation approach of the bump electrode 22 of the semi-conductor pellet (the 1st substrate) 10. In the location corresponding to the electrode 13 of the process which forms the electrode 13 which has wettability to the ingredient of the bump electrode 22 on the front face of the semi-conductor pellet 10, and said semi-conductor pellet 10 The imprint substrate 20 (the 2nd substrate) with which the bump electrode 22 was formed on the front face which does not have wettability to the ingredient of the bump electrode 22 is prepared beforehand. The front face of said imprint substrate 20 on the front face of said semi-conductor pellet 10 Facing each other, While performing the process and solder reflow process which arrange the bump electrode 22 of said imprint substrate 20 in contact with the electrode 13 top of said semi-conductor pellet 10 and securing the wettability of the electrode 13 of said semi-conductor pellet 10, and the bump electrode 22 The front face of the electrode 13 of the semi-conductor pellet 10 is equipped with the process which imprints the bump electrode 22, and the process which removes said imprint substrate 20 from on the front face of said semi-conductor pellet 10 from the front face of said imprint substrate 20.

[0042] The following operation effectiveness is acquired by this configuration. (A) As opposed to a series of formation processes which form the bump electrode 20 in the electrode 13 of the front face of said semi-conductor pellet 10 The process which forms bump electrode 22 the very thing is processed in juxtaposition as a formation process of the imprint substrate 20. Since the process which removes the process and the imprint substrate 20 which imprint the bump electrode 22 from the imprint substrate 20 is only added to a series of formation processes of said semi-conductor pellet 10 A series of formation processes of the part equivalent to the process which forms bump electrode 22 the very thing, and said semi-conductor pellet 10 are shortened, and the period required by process completion can be shortened. (B) From a series of formation processes of said semi-conductor pellet 10, by that (the management can be transferred to the formation process of the imprint substrate 20) which can eliminate the process which forms bump electrode 22 the very thing, generating of the pollutant accompanying the process which forms bump electrode 22 the very thing in a series of formation processes of said semi-conductor pellet 10 can be eliminated, and the yield can be improved in a series of formation processes of said semi-conductor pellet 10. (C) Since the process which imprints the bump electrode 22 of the imprint substrate 20 to the electrode 13 of the front face of said semi-conductor pellet 10 can be made to serve a double purpose at the reflow process included in a series of formation processes of said semi-conductor pellet 10, a series of formation processes of the part which made this process serve a double purpose, and said semi-conductor pellet 10 are shortened, and the period required by process completion can be shortened.

[0043] In addition, this invention may form the imprint substrate 20 with other substrates with which wettability with a bump electrode has a bad front face, such as a semiconductor wafer (single crystal silicon substrate) in which Cr film was formed on the front face, an alumina substrate, and a quartz substrate.

[0044] Moreover, this invention may form the bump electrode 22 with other low-melt point point solder, such as Sn-Ag system solder and Au-Sn system solder.

[0045] Moreover, a metal mask may be used for this invention and it may form the bump electrode 22 in the imprint substrate 20 with solder vacuum deposition.

[0046] Moreover, before forming the semi-conductor pellet 10 that is, this invention may imprint the bump electrode 22 from the imprint substrate 20 to the electrode 13 of the field of said semi-conductor pellet, when the field of two or more semi-conductor pellets is formed in a semiconductor wafer 10.

[0047] (Example of fruit ** 2) In case this example 2 mounts this semi-conductor pellet in a mounting substrate after the characteristic inspection of a semi-conductor pellet, it is the 2nd example of this invention which imprints

a bump electrode.
[0048] The inspection approach of a semi-conductor pellet and the mounting approach of being the example 2 of this invention are shown in drawing 1 (outline sectional view shown for every process).
[0049] First, as shown in drawing 9 (A), the semi-conductor pellet 10 is carried in the checking substrate (testing board) 40. This loading is performed by intervening the bump electrode 22 between the electrode 41 of the checking substrate 40, and the electrode 13 of the semi-conductor pellet 10. And the characteristic inspection of the circuit system of the semi-conductor pellet 10 is conducted through the checking substrate 40.
[0050] Next, it secedes from the checking substrate 40 to the semi-conductor pellet 10, heating and fusing the bump electrode 22, as shown in drawing 9 (B). Then, the bump electrode 22 which remains in the electrode 13 of said semi-conductor pellet 10 is removed. The bump electrode 22 is easily removable by making Cu substrate absorb.
[0051] Next, as shown in drawing 9 (C), positioning with the electrode 33 of facing each other and the mounting substrate 30 and the bump electrode 22 of the imprint substrate 20 is performed for the imprint substrate 20 to the mounting substrate 30.
[0052] Next, as shown in drawing 9 (D), a solder reflow is given and the bump electrode 22 is imprinted from the imprint substrate 20 to the electrode 33 of the mounting substrate 30.
[0053] Next, as shown in drawing 9 (E), the bump electrode 22 is placed between the mounting substrate 30, and the semi-conductor pellet 10 is mounted in it.
[0054] Thus, according to the formation approach of the bump electrode 22 of this invention, after placing the bump electrode 22 between the checking substrate 40, carrying the semi-conductor pellet 10 in it and conducting the characteristic inspection of this semi-conductor pellet 10, the bump electrode 22 is again formed in the mounting substrate 30 or the semi-conductor pellet 10 simply, and the semi-conductor pellet 10 can be mounted in the mounting substrate 30.
[0055] Moreover, when according to the formation approach of the bump electrode 22 of this invention two or more semi-conductor pellets 10 are mounted in the mounting substrate 30 and a defect occurs on some semi-conductor pellets 10, the semi-conductor pellet 10 which the defect generated is removed, the bump electrode 22 is imprinted as an object for restoration into this removed part, and the new semi-conductor pellet 10 can be remounted. That is, repair becomes possible.
[0056] moreover, the case where a defect occurs in the electrode 13 of the semi-conductor pellet 10 according to the formation approach of the bump electrode 22 of this invention -- beforehand -- FIB (Focus Ion Beam) -- it can correct partially by law and the bump electrode 22 can be formed next.
[0057] Moreover, according to the formation approach of the bump electrode 22 of this invention, the bump electrode 22 can be formed in the mounting substrate 30 of large-sized size by repeating and using two or more imprint substrates 20, and imprinting the BAMBU electrode 22. Consequently, development of the large-sized electrode formation equipment which forms the bump electrode 22 in the mounting substrate 30 of large-sized size, installation, or plant-and-equipment investment can be lost.
[0058] (Example of fruit ** 3) This example 3 is the 3rd example explaining the option which forms a bump electrode in an imprint substrate of this invention.
[0059] The formation approach of the imprint substrate which is the example 3 of this invention is shown in drawing 10 (outline block diagram of bump formation equipment).
[0060] As shown in drawing 10 , the imprint substrate 20 of this example 3 forms bump electrode formative layer 22F the whole surface on the front face of the oxidization silicon film 21, performs pattern NINGU to these bump electrode formative layer 22F, and forms the bump electrode 22. Pattern NINGU of bump electrode formative layer 22F is performed by the laser beam 52. A laser beam 52 is oscillated from the source 51 of laser oscillation, and this source 51 of laser oscillation is controlled by the laser control circuit 50.
[0061] As mentioned above, although invention made by this invention person was concretely explained based on said example, as for this invention, it is needless to say for it to be able to change variously in the range which is not limited to said example and does not deviate from the summary.
[0062]
[Effect of the Invention] It will be as follows if the effectiveness acquired by the typical thing among invention indicated in this application is explained briefly.
[0063] **** compaction can be aimed at in the bump electrode formation technique of a substrate.
[0064] The yield can be improved in the bump electrode formation technique of a substrate.
[0065] A bump electrode can be formed in a large-sized substrate in the bump electrode formation technique of a substrate.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The sectional view of the imprint substrate of the example 1 of this invention.
[Drawing 2] The perspective view of the wafer condition of said imprint substrate.
[Drawing 3] The semi-conductor pellet of the 1st process explaining the imprint approach, and the sectional view of an imprint substrate.
[Drawing 4] The semi-conductor pellet of the 2nd process, and the sectional view of an imprint substrate.
[Drawing 5] The semi-conductor pellet of the 3rd process, and the sectional view of an imprint substrate.
[Drawing 6] The perspective view of the semi-conductor pellet of the 4th process.
[Drawing 7] It is the sectional view of the electrode in the condition that, as for (A), the sectional view of the electrode of a semi-conductor pellet was formed, and, as for (B), the bump electrode was formed.
[Drawing 8] The mounting substrate of the 5th process, and the sectional view of a semi-conductor pellet.
[Drawing 9] (A) Or (E) is a sectional view for every process explaining the imprint approach of the example 2 of this invention.
[Drawing 10] The block diagram showing the formation approach of the bump electrode of the example 3 of this invention.
[Description of Notations]
10 — Semi-conductor pellet
13, 33, 41 — Electrode
20 — Imprint substrate
21 — Oxidation silicon film
22 — Bump electrode
30 — Mounting substrate
40 — Checking substrate

[Translation done.]